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THE DEVELOPMENT OF THE SCHOOL MUSEUM.

II.

THE school museum has as its function the solving of problems relating to availability, use, and educational value of various materials collected for and through class study. It should be intimately associated with the school library, which has as its function the solving of problems relating to availability, use, and educational value of reference books, pictures, maps, etc., in school work. Each should be unifying, organically related, working centers for a great part of the school work.

The real value of the museum is to be computed in terms of its influence on the working efficiency and intelligence of the entire student body of the school. Its influence is greatest when its content of material and its arrangement is in intimate accord with the thought-movement of the several branches or phases of study of the school work. If a class was studying the processes, products, and uses of iron, the museum should establish some relation with the study whereby these processes and products could be observed, or could be collected and arranged to show varieties of ore and stages in its development.

THE RISE OF THE SCHOOL MUSEUM.

The organization of a school museum presupposes a shift from the constant use of a text-book to an interrelated use of the text- or reference-book with the actual material. The lowest stage of teaching was when the student was confined to one text-book as the entire source of his effort and information; the advent of supplementary reading marked a distinct stage of progress in teaching, and naturally culminated in the establishment of the school library. This gave the student several points of view, and admitted of some comparison and personal opinion; it fostered individuality. A third stage of advance in teaching is marked by the liberal use of materials common to the student's nature and social environment. It places the student's sense-

experience, observation, and imagination first, and by reading and expression leads him to broader and more correct interpretations and conceptions. So long as the mass of the school work was carried on in the class-room, with the text and the teacher as the sources of knowledge, there was no museum problem, for the simple reason that, since it was all in the book, neither teacher nor pupils felt any distinct need for the use of materials. But, with the advent of laboratories, workshops, field work, and the use of illustrative materials in general class work, there arises a very distinct problem as to economic methods of securing, preserving, and distributing these materials for study. The advantages of centralizing these materials in a museum are the same as the advantages of centralizing the reference books in a library, and modern school architecture should make provision for both, either combined in one room or in separate but adjoining rooms. The nature, variety, and quality of the school-museum materials are problems to be determined by the several classes and subjects of study of the school; or, in other words, by the teaching methods and course of study of the school.

The question resolves itself into: (1) Can the use of actual materials, correlated, so far as possible with the text- and reference-books, render teaching more effective in the educating process than the text- and reference-books alone? (2) From what standpoint of approach, or method of use, may materials be most effective in the educating or developing process? These questions are new in application only. From the point of genesis they belong to the period when the questions relative to the establishing of laboratories in science-teaching were first raised. Since that time many of the things which were then in a hypothetical or experimental stage have, through broader conceptions and application, become great industrial and social factors; they have, by their application, become revolutionizing factors in human progress, both mental and material. There are grave signs that the schools are failing to follow these experiments and experiences through the laboratories and workshops, into their broader application in the nature and social world, and by this failure are leaving the students without broad up-to-date

conceptions of their true environment. The result is that the student, on leaving school, instead of finding himself in working adjustment with the environment for which he was being educated, finds himself out of adjustment and with narrowed experiences because of his school isolation. We may take infinite pains to properly educate students, while at the same time, from lack of broad experience, spontaneous mental action, and opportunity for individual initiative, we are deadening many of their higher individual qualities.

The school museum should mark that stage in school work where students and teachers follow the hints and suggestions of the class-room out into the broader, nature and social, environment, and discover their broader meanings and applications. No special good can come from knowing materials, facts, and phenomena apart from their true environment.

In elementary education the methods and conditions of securing knowledge are of infinitely greater value than the facts themselves. Unless the facts and experiences of the pupils are the product of environment, something organically connected with environment, and existing as they do because of this relation, they have little intrinsic educative value. Science criticism has long since abashed the teacher for attempting the dissection of the crayfish without the student being first acquainted with its haunts and habits; but the teaching of number for number's sake, and demands for expression with nothing to express, has not yet blushed.

The intent of this seeming diversion from the main topic is to point out that the school museum may be a poor factor in a school, unless the school has first felt some need for material in its work. Dust-covered cases, with unused and unkept materials, are not rare sights in these days; just as there was a time of locked cases and unused books in the days that marked the beginnings of school libraries. There is nothing of intrinsic value in materials, for school work, apart from an individual, mental or physical, need for the material. In the manual-training room the student feels a need for wood when he has something to construct; the kind of wood selected should be determined, to a degree, by the

thing to be constructed and the student's knowledge of the woods that are best adapted to the purpose . This feeling of purpose, of use, with the emotion that it carries with it, and experienced by every enthusiastic student who has a problem is something of the emotion which we wish to have students experience in their work with museum materials.

Museum materials may influence the student's life in three ways: (1) by enlarging his range of acquaintance with materials, its occurrence, nature, variety, and properties, through sense and personal contact; (2) by broadening his conception of the relations, occurrence, meaning, uses, and developing possibilities of materials; (3) by exhibiting products representative of high or progressive development in human skill and intelligence, thus giving students broader conceptions of human power and possibilities and higher ideals. I cannot conceive of education being broadly effective unless it takes into well-balanced account these three essentials.

The school-museum collection may grow in three ways: (1) by purchase and donation; (2) by curator collection and exchange; (3) by student collection and exchange. The mass of the collection should be the product of the work of the school; its arrangement an expression of the content and direction of student skill and thought-movement. The museum is equally interested in both living and dead, organic and inorganic materials.

THE DEVELOPMENT OF THE MUSEUM COLLECTION.

1. *Student collection.*—The exact content of the school museum and the arrangement of this content will be determined by the class work and the age of the students using it. The museum of the School of Education is planned to accommodate students from the kindergarten to the adult in the College.

It is desirable to keep in mind that, educating being a cumulative process, the materials must be constantly shifted to keep in accord with the growing thought and conception of the students. The museum must take equally into account working facilities for students and display of material. There is no normal phase of interest in material that is too insignificant for the museum to

recognize and foster. If the most elementary pupils are interested in the variety of shapes and colors of minerals found along the lakeshore, then the museum cultivates that interest by affording a storage place for their collection. It also furthers their interests and experiences by giving the pupils access to a still greater variety of mineral colors and forms.

When at a little later stage these students begin to recognize quartzes, granites, sandstones, limestones, etc., their earlier collections are available for additions, tests, and rearrangements. This experience is again extended by the museum giving them access to a greater variety of quartzes, granites, sandstones, etc. Again their class study may lead them to observe building and decorating stones, and again they readjust and renew their collection from this new standpoint. In this way a number of collections, each representing some different conception of minerals or rocks, are made. The student's conception and experience is gradually broadened, and the museum collection is intimately connected with some natural outdoor environment; and the development of a quality of mind-actions by which this isolated collection is projected into its natural out-of-school setting is one of the most important parts of it. The same idea applies to plants, animals, and industrial products. With a little care in frequent use of names the students are soon on speaking terms with many of the common objects of their environment.

As rapidly as new relations become intelligible the student should be encouraged, during his studies, to collect materials and arrange them in the light of his new conception.

As the student grows in age and experience, the ideas involved in study expand, and more detail and greater range are taken into account. Whereas in the earlier stage variety of stones used in building were taken into account, later he may study: (1) the original locations of these stones (on map); (2) methods of quarrying; (3) wedges, powder, fuse; (4) dressing tools; (5) methods of shipment; (6) variety of uses; (7) polishing tools, etc. And through it all the student is becoming familiar with names, properties, and processes. In many places drawings or sentences are introduced in order to bridge gaps and insure connections. Or

again the study may be bricks, tiling, etc., culminating in a study of all the stages, processes and uses of clay. So also in the field work there are a multitude of demands, if the work is to be most effective, for the collection and arrangement of materials. It would prove an interesting diversion to summarize the number of science generalizations which were made possible only through bringing together, out of time and space, collections of materials.

In the study of earth-surface types of topography we discover that certain forces have been at work molding this topography. There are certain marks by which the presence of these forces are recognized. Interesting groups can be made by collecting mineral materials, as marked and reduced by (1) running water — the variety of materials found along river valleys. (2) Wave action — variety of minerals, their forms and stages of disintegration, as found along a lake- or seashore. (3) Products of glaciation, etc.

Intimately connected with this work is the reproduction of type regions by models. In all instances the material is being used to convey some idea; it is arranged to exhibit some meaning, and the student gradually develops the habit of looking for meaning in materials.

Collecting under this incentive demands of pupils a definite purpose to insure the selection of materials that show some relationship. This working with materials develops, through sense-contact, a quality of mind-action that cannot be developed in any other way. The bringing together of materials from widely separate areas leads to the discovery of relationships that under all other conditions would remain undiscovered, and develops habits of looking for relations where previously they were unsuspected. By gaining some power in detecting obscure relationships the mind gradually gains a certain intelligent mastery over the two great obscuring factors, time and space, and is gradually able to grasp the organic connections of erosion forces, surface forms, and sedimentary rock formations.

So also with some working experience in the school museum the student soon gains some efficiency in the intelligent use of the magnificent collections in our endowed and municipal art, indus-

trial, and natural-history museums. One of the great problems of the elementary and secondary schools is the saving of time. The course of study is already overcrowded, and new studies, which cannot be denied, are knocking for admission. The way out is through some method of study which will increase the working efficiency of the student. One of the ways of gaining efficiency is by giving the student an earlier independent working mastery in school work; less of artificial methods, and more toward stimulating student needs and desire; less of student drudgery, and more enthusiasm and life; less dependence, and more originality. And, above all, the riddance, of the elementary school, of the waste of time and the drudgery of expression is through having something real and vital to express, whether it be through language, reading, writing, color, modeling, or the actual things.

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A SERIES OF LESSONS FOR THE SIXTH GRADE.

THE following outline of work on the St. Lawrence basin is planned for sixth-grade children to be worked out during the autumn quarter. It was chosen both as a study of a typical river in the youthful stage of erosion and as a background for the history of the French settlements in America.

The aims in the work will be to develop vivid images, to assist in the intelligent use of maps and books, and to further the conception of physiographic processes as now at work, shaping and modifying topography.

Because of the approach of winter the field work must necessarily be done in the early part of the quarter. The following physiographic processes which obtain in the St. Lawrence will be worked out in the laboratory and in field trips:

Development of valleys: growth of a river — formation of gorge, flood plain, terrace.

Work of rivers: erosion, transportation, deposition.

Form of divides, shifting of divides.

A graded stream: formation of rapids, falls, and lakes; meaning of base level.

Wave action: drowned coast, building coast.

A trip will be taken to "Englewood on the Hill" to see the water parting between the St. Lawrence and the Mississippi Rivers. This divide is charac-

teristic of those of the St. Lawrence basin generally, and so great has been the importance of these low divides that they will be emphasized. These have caused in part the shifting of drainage which has been so marked in the history of the region. The water parting between Lake Champlain and the Hudson is only 180 feet — only 208 feet above sea level. This fact, in connection with the evidence of the sea having covered the region of Montreal and south of it to a height of 600 feet, opens up a great picture of changed conditions there. It means that at that period the region included between the Atlantic Ocean and the Hudson, Richelieu, and St. Lawrence Rivers was cut off from the mainland entirely; in other words, that New England was an island. The low divides have meant much, too, from a historical standpoint. The divide between the Fox and the Wisconsin Rivers, Lake Michigan and the Des Plaines, Lake Erie and the Mohawk, Lake Erie and the Alleghany, Lake George and the Hudson, have all determined routes of travel and consequent settlements.

We shall visit Glencoe, Ill., where the work of rivers and wave action are well illustrated. A few of the children who can go away for thirty-six hours, at an expense of $5, will be taken to Starved Rock on the Illinois River — a trip of the greatest importance both from the geographic and the historic standpoint. These children will report to the rest of the class upon their return.

Upon these field trips questions arise which in some cases might be answered by repeated visits; but this is impracticable because of the distance of the places from the school. In other cases the processes are so slow that they may not be observed by the children. The laboratory is used to solve just these questions. It consists of a vacant city lot, and a hose fitted with various nozzles which modify the flow of water from a spray to a heavy stream. Here the children may work from two standpoints. If a question arises as to a given phenomenon in river action — as for instance, the formation of falls — they may watch the stream flowing over the ground, note the making of falls, and draw their conclusions. Or they may have a hypothesis for the formation of falls; they may then go out, arrange conditions to test the hypothesis, and observe what follows. A stream of water from the hose may illustrate in one hour the following points in river action: erosion, transportation, deposition, sorting material; making of a gorge, of falls, of rapids, and of lakes. They can see demonstrated the formation of a broad valley, with flood plain and meanders, terraces, ox-bow lakes, deltas, and base-leveling.

By digging a good-sized hole and filling it with water, wave action may be produced by agitating the water. Here the formation of a beach, cliffs, offshore sand reefs, spits, bars, and barriers may be illustrated. The effects of rising and sinking of land may be shown also by inserting a pipe under ground, through which, by draining, the level of the water may be lowered,

or into which the hose may be carried to raise the water level (the relations remaining the same whether the land rises or water sinks).

In addition to the physiography the work will cover the study of the St. Lawrence as a unit of drainage, its location in North America, its area, and its comparison in these particulars with other rivers of North America. It will emphasize the peculiarity of its location on the extreme southern side of its own drainage basin, with seven-eighths of its drainage from the north, and with only Lake Champlain and Lake George and their outlet, the Richelieu River, draining from the south. We shall note the characteristics of the river, with its source and the remarkable widening into the sequence of Great Lakes, its rapids, their interruption to navigation, and the overcoming of these obstacles by the magnificent series of canals; the widening of the lower St. Lawrence into the chain of small lakes, known as Lakes St. Francis, St. Louis, and St. Peter; its final gulf-like breadth from Cape Range, below Quebec, to its end at the western point of Anticosti, where it expands to the width of a hundred miles. We shall study its tributaries; on the north numerous, but navigable only a short distance back from the trunk river, because of the invariable falls and rapids; on the south less numerous, but navigable and important because separated from adjacent river systems by very low divides, as at Rivière du Loup, where the headwaters of the St. John are but twenty-five miles distant, the old route of the war-parties of the Mohawks; the Chaudière rising close to the Kennebec, this being the route which Arnold took when he came from Maine to besiege Quebec; and the Richelieu with its lakes, rising very near to the Hudson, through which valley the tides of invasion swept to and fro during the colonial wars. Farther west are the Miami and the Fox, connecting the St. Lawrence directly with the Mississippi itself. The region, as a whole, would be considered as a great wooded area, comparatively low, and including myriads of fresh-water lakes. Professor Dawson says that this basin alone contains one-half of the fresh water of the globe.

The class will estimate the distances referred to above in length of the river and its comparison with other rivers, by reference to Longmans' atlas, and test their estimates by the scale of miles used on the map. Distance will be interpreted by estimating the time it would take to travel that distance by modern boat, or train, or primitive canoe.

North America will be modeled in sand, and the relation of the St. Lawrence to other drainage systems will be shown. This region will also be modeled separately for the sake of gaining better ideas of relations of its own features, the innumerable lakes, long northern tributaries, and infrequent southern ones.

The children should picture this region so vividly that, as they people it with the early French explorers, they may foresee their movements, their settlements, and the industries which the topographic conditions determined.

For instance, the Saguenay, navigable for seventy-one miles, and the good harbor at Tadanssac predetermined the settlement established there. Quebec, on its impregnable rocky height just beyond Cape Range, where the St. Lawrence narrows and where the St. Charles River joins the main stream, fulfils every requirement for an ideal city and citadel. Again, the Falls of Niagara prevented navigation. In time a portage had to be made about the Falls, and this necessitated two settlements, one at each end of the Portage — one at Fort Niagara on Lake Ontario, and whether at Fort Cayuga or a bit farther south, at Buffalo, is a matter of little import.

If the work has been vital to the children, they will have been brought face to face with difficulties, and will have asked questions concerning measurements, weights, length of time, and exertion of energy. All these are mathematical relations, and so much of number work must be correlated as to answer these questions.

Concerning the Niagara Falls alone, an immense amount of one's thinking is in mathematical relations, if it be clear-cut.

The falls have cut back 7 miles from the escarpment at Queenstown. What is their ultimate fate? They are now cutting back at a rate of 7.65 inches annually on the American side, and 26 inches on the Canadian side. If they continue at this rate, when will they reach Lake Erie and their history be at an end?

The Canadian falls erode 2 feet 2 inches annually. They are 3,000 feet wide and 158 feet high. How many cubic feet are eroded annually? When that is computed, and reduced to a form which is comprehensible — as, for instance, that it erodes enough material to cover a narrow-gauge road 1 foot deep for 42 miles — the children have something of an understanding of the work.

Over the Canadian falls 7,000 tons of water fall per second. This is four-fifths of the total amount. What is the total weight of the water?

Men measure the work of machines by horse-power. One horse-power is the force to lift 33,000 pounds up one foot in one minute. Men have found that the 7,000 tons' weight of water per second can be converted into energy to run their factories. What is the fall of water per minute over the Canadian Falls? Then in these falls 42,00c tons of water pass through 158 feet of space, the height of the falls. Find the horse-power of the Canadian falls. This is four-fifths of the whole. Find the horse-power of the two falls.

An ordinary steam dredge exerts 40 horse-power per hour. How do the falls compare with our mechanical methods of dredging?

One pound of Newport coal furnishes one horse-power of energy for one hour. The great manufacturing interests at Niagara have made the work of the falling water supply the place of fuel. Estimating eight hours per day, find the daily saving on fuel with Newport coal at $7 per ton.

The foregoing problems are given simply as illustrative of the need of

arithmetical work in any part of the subject. The locks of the Sault Ste. Marie, the economy of the canal system, the work of the St. Lawrence in eroding annually, the mining interests of the Superior region, the estimate of time necessary to travel given distances at a given rate — all require the aid of mathematics to be intelligible.

In the minds of the children an immediate use for this work is in the making of a model of the St. Lawrence basin for the school. The model is to be of clay, then cast in plaster of paris and shellacked so that a stream of water may be made to run through it, illustrating the flow of the St. Lawrence, through the Great Lakes, over Niagara, to the sea. The horizontal scale adopted will be 280 miles to 1 foot, but to use this for the vertical scale makes the slope of land imperceptible, therefore for vertical distances the scale will be 150 feet to 1 inch. Because of the various considerations determining the scale which were beyond the children's experience, it had been worked out by the teacher, to be submitted to the children.

Below are given the measurements of the model, as an illustration of the number work involved, as well as the proportions of the resultant model:

TABLE OF DISTANCES AND MEASUREMENTS.

Lake	Actual Distances		Measurements on Model	
	Length	Width	Length	Width
Superior	420 miles	80 miles	1 ft. 6 in.	$3\frac{3}{7}$ in.
Michigan	345	58	1 $2\frac{11}{14}$	$2\frac{17}{35}$
Huron	400	70	1 $5\frac{1}{7}$	3
St. Clair	25	20	$1\frac{1}{14}$	$\frac{6}{7}$
Erie	250	38	$10\frac{5}{7}$	$1\frac{22}{35}$
Ontario	190	40	$8\frac{1}{7}$	$1\frac{5}{7}$

End of Lake Ontario to St. Belle Island, 1,116 miles; 3 feet $11\frac{5}{6}$ inches on model.

Lake	Height above Sea Level		Depth	
	Actual	On Model	Actual	On Model
Superior	602 ft.	4 in.	900 ft.	6 in.
Michigan	578	$3\frac{4}{5}$	1,000	$6\frac{2}{3}$
Huron	576	$3\frac{5}{6}$	500	$3\frac{1}{3}$
Erie	566	$3\frac{2}{3}$	90	$\frac{3}{5}$
Ontario	240	$1\frac{3}{5}$	412	$2\frac{2}{3}$

ELEVATIONS.

	Actual	On Model
Laurentian tableland, north of St. Lawrence	1,000–1,600 ft.	$6\frac{2}{2}$–$10\frac{2}{3}$ in.
Cape Tourmente	1,920	$12\frac{4}{5}$
Les Ebaulements	2,547	17
Saguenay Mountains	1,800	12
Mountains north of Montreal, rising from the shore of Trembling Lake	2,380	$13\frac{4}{5}$

All measurements will be worked out by the children on the above scale, using the data on distances given by Professor Dawson in Stanford's *Compendium of North America,* Vol. I.

Besides computing the above measurements and making the wooden box to hold the model, much skill must be gained in portraying the region before the final model can be made. This skill will be gained through frequent modeling in sand, and quick blackboard drawing and modeling.

As the children are drawing and modeling, use will be made of pictures of the region. Descriptions will be given, that they may translate the symbol into real proportions and add to it, in thought, the color, sound, and movement in the landscape, as far as may be. In addition to the quick temporary sketches, a series of more permanent illustrations of the region will be made. The children will use different mediums suited to the demands of the subject, as pencil, charcoal, colored crayons, or paints.

The subjects which would cover the typical things of the region are given below, and as many of them will be illustrated as time will permit:

Chalk-modeling of views seen on field trips; typical scenes along the St. Lawrence, as: the shores of the gulf; fishing off the banks; Harbor at Tadoussac; views of the Saguenay; location of Quebec; views of the Laurentians at Lake Edwards in the heart of the mountains on the road from Quebec to Lake St. John; views of the present fort at Quebec; views of Champlain's fort; lower town and Levis from Dufferin Terrace; the long narrow farms, each fronting on the river, which extend from Quebec to Ste. Anne de Beaupré; Montmorency Falls and natural steps; views of Montreal; Notre Dame, Victoria Bridge; Mount Royal; the Laurentians as seen from Mount Royal; Thousand Islands; old fort at Frontenac, now Kingston; view of sand bar in harbor at Toronto; views of Niagara Falls; Niagara gorge and the whirlpool; fort at Niagara on the lake; the locks of Sault Ste. Marie; picture rocks of Lake Superior; industries: lumbering, fishing, the use of the water power at Niagara, and the great wheat-fields of the Northwest.

Written descriptions of places, unless done by the hand of an artist, so as to be very telling, have little power of arousing intense images or interest in children. But if they are planning to make a model of the gulf of the St. Lawrence, for instance, the utmost delight is felt upon finding some such prosaic but clear description as the following: "The New Brunswick shore of the gulf of the St. Lawrence is uniformly low and wooded. Rivers empty into lagoons formed by bars and spits of sand, but there are no shoals or rocks. The south shore of the St. Lawrence for a long distance from Gaspé is high and bold, for mountains rise up from the bank wooded to their summits, and there is little room along the bank except for small fishing hamlets," etc.

But for graphic, poetic descriptions the children cannot do better than

to read from Champlain's *Journal of My Voyages.* Besides the picturing of the region, one gets intensely the spirit of the explorer as this new world first appeared to him. Champlain's *Journal* is published only in one edition, and that retains the old English print; therefore it would be necessary either to read it aloud or to have extracts reprinted. But this is one of the instances where a thing of real literary value may be substituted for mere text-book statements.

This brings us to the relation of the history and geography in the grade. The history for this quarter will be the settlements of the French along the St. Lawrence and Great Lakes, namely, at Tadoussac, Quebec, Montreal, Detroit, Frontenac, Niagara, Mackilimacinac, and Duluth; and will include the discoveries of Cartier, Champlain, Frontenac, Marquette, La Salle, and Tonty. The achievements of La Salle and Marquette carry us to the Mississippi; and still the story would be unfinished, so the *dénouement* of French possessions in America, the French and Indian war, will be briefly told, with few details.

The class will be encouraged to bring magazine pictures or articles associated with this region as a loan collection. The following reading matter will be put into their hands, and any which they think valuable they will catalogue as to title, author, and page. This catalogue would be really valuable, not because of its completeness, but as representative of the children's interests.

CHILDREN'S READING LIST.

TEXT-BOOKS: Longman, *Atlas;* Tarr and McMurray, *Geography,* Books I and II; King, *Geographical Readers;* M. M. George, *Little Journeys to Alaska and Canada;* McMaster, *History of the United States;* Higginson, *Book of American Explorers.*

Selected passages from the following: Carroll, *Illustrated Guide Book and Map of Quebec;* Baedeker, *Guide to Canada;* Chamber, *Guide Book of Quebec;* Stanford, *Compendium of North America,* Vol. I, by S. E. Dawson, Réclus, *Earth and its Inhabitants* (for pictures); Porter, *Niagara Book;* LeMoine, *Picturesque Quebec;* Sir Gilbert Parker, **[1] *Quebec;* Fiske, *Discovery of America;* Champlain, **[1] *Voyages;* Winson, **From Cartier to Frontenac;* Parkman, **Frontenac and New France under Louis XIV; idem,* *[1]*Pioneers of France in the New World; idem, *The Old Régime in Canada; idem, LaSalle and the Great West;* M. H. Catherwood, * "Bells of Ste Anne," *St Nicholas,* Vol. XVI, p. 91, continued on p. 492; G. A. Buffum, "Winter Carnivals in Montreal," *ibid,* Vol. XII, pp. 284-87; W. S. Harwood, "The Great Lakes," *ibid.,* Vol. XVI, p. 195; "Canadian Scenic Splendors," *ibid.,* p. 145 (for pictures only); "Quebec," *ibid.,* p. 554; "Bicycling from Montreal to Ste Anne," *Outing,* Vol. XXXVIII, p. 493; * "Quebec," *New England Magazine,* Vol. XXI, p. 33; *Harper's,* Vol. LXXVII, p. 184; *ibid.,* Vol. LXIX, p. 197; M. H. Catherwood, *Story of Tonty.

TEACHERS' REFERENCES.

**U. S. Geological Survey,* and **Canadian Geological Survey,* of regions considered; Champlain, **Voyages;* Gilbert, **Monograph on Niagara Falls;* Réclus

[1] Especially helpful.

Earth and its inhabitants, "North America," Vol. I; *idem, The Earth;* Le Conte, Scott, Geikie, text-books; Stanford, *Compendium of North America,* Vol. I, by S. E. Dawson; Shaler, *Our Continent;* "Niagara and the Great Lakes," *American Journal of Science,* 3rd Series, Vol. XLIX, 1895; Basil R. H. Hall, "Forty Etchings made from sketches with the Camera Lucida in North America in 1827 and 1828;" James Hall, "Niagara Falls," *Natural History of New York, Geology,* Part IV; Charles Lyell, *Travels in North America;* M. H. Catherwood, **Story of Tonty;* W. D. Howells, *Our Wedding Journey; idem, A Chance Acquaintance;* *Fiske in *Harper's,* Vol. XXV, pp. 65-107; Hinsdale, *The Old Northwest;* Drake, *Making of the Northwest;* Winsor, *Narrative History, Vol IV;* Fiske, **Discovery of America,* Vol. II; Blanchard, *Discovery of the Northwest.* "Quebec," *Canadian Magazine,* Vol. XVI, p. 554; "Newfoundland Seal Hunters," *ibid.,* p. 195; "Canadian Scenic Splendors," *ibid.,* p. 145; several articles, *ibid.,* Vol. X; "Quebec," *New England Magazine,* Vol. XXI, p. 33; "Bicycling from Montreal to Ste Anne," *Outing,* Vol. XXXVIII, p. 423; "Quebec the Crowned City," *Outlook,* Vol. LXVII, p. 521; "Historic Quebec," *Chautauqua,* Vol. XV, p. 422; "Canal System of Canada," *ibid.,* Vol. XVII, p. 302; "Great Lakes — The Locks of the Sault Ste Marie," *Review of Reviews; Studio,* Vol. V, p. 200.

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